AN ANALYSIS OF PROPOSALS TO IMPOSE COPYRIGHT PAYMENT ON THE CABLE TELEVISION INDUSTRY FOR THE RETRANSMISSION OF TELEVISION BROADCASTS

by

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Executive Summary

This paper examines the economic justification of imposing copyright payment on CATV (also known as Cable) operators for their retransmission of over-the-air broadcasts. The analysis is conducted on both a theoretic and empirical level. Our major finding is that CATV increases advertising revenues and that imposition of copyright payments on Cable appears unjustified.

In the theoretical section we examine the rationale behind various copyright proposals put forth by Keyes and Brunet, the Economic Council and other interested parties. The key assumption implicit in each proposal is the belief that CATV reduces advertising revenues of over-the-air broadcasters and thus copyright payments made by said broadcasters. In each case the motive behind the copyright proposal is to re-establish the copyright payments back to a level which would occur without the existence of CATV.

These proposals differ in the approach taken to re-establish these revenues. In each case, the group in the population which is required to pay the amount necessary to keep these copyright payments from being reduced by CATV is different from the group which would have paid without the existence of CATV. In the text we suggest alternatives which, when compared to these proposals, are more likely to have copyright payments being made by the same segment of the population which would generate these payments without the interference of CATV.

In the paper we also present a short discussion of the advantages and disadvantages of the system used to generate copyright payments prior to including CATV in the generation of these payments. In other words, we discuss the merits of the present system of supporting television programming with

advertising revenues. No policy conclusions are made with respect to this subject.

The second half of this paper is concerned with estimation of the impact of CATV on over-the-air broadcasting revenues. There are several ways in which CATV influences revenues of broadcasters.

CATV is known to cause 'market fragmentation'. In other words viewers in a given locality who might have access to one station, say station X, prior to the introduction of CATV will have, after the introduction of CATV, many more stations which they may watch. Station X's share of the local audience will drop because people on Cable will watch some of the distant stations brought in by Cable. The loss of viewers to station X is the gain to distant stations. On the other hand viewers in distant localities will be able to watch station X on their Cable and this will tend to increase station X's audience. Even if station X's total audience remains the same, the average distance from transmitter to viewer has increased. This is market fragmentation.

This fragmentation is thought to reduce advertising revenues because advertisers in a given locality might not value viewers in a distant locality as much as they value local viewers. This is due to the fact that distant viewers are less likely to patronize local establishments since these viewers would have to travel a long way to reach them. The existence of national or regional advertisers with outlets in many localities mitigates the impact of market fragmentation since these advertisers are likely to place similar values on viewers in all localities.

We measure the potential impact of fragmentation by determining the relative values of local and distant viewers to advertisers. Our statistical

techniques allow us to determine the average advertising rate per person for distant viewers and for local viewers. We find that in general, local viewers are worth twice as much as distant viewers to advertisers. Our confidence in these results is not extremely high due to several factors. First, these results are barely statistically significant; in other words it is likely to occur by chance one out of twenty times. Second, when we compare the value of local versus distant viewers for local advertisers, the local viewers are worth no more than the distant viewers, contrary to expectations. Third, our data collection regarding local and distant viewers is not very precise and the chances for mistakes are high.

We then estimate the greatest possible decrease in advertising revenues given our previous results. Twenty-six percent of television viewers in Canada are located outside of the local area. We assume that there would be no distant viewers without the existence of CATV (a very unlikely assumption). The reduction in advertising revenues if distant viewers are half the worth of local viewers to advertisers would be 13%. This is most likely an overstatement of the impact of market fragmentation.

CATV will likely have positive effects on advertising revenues which may or may not counteract the impact of market fragmentation. Since CATV increases the choice of programs available to viewers and since they are willing to pay for CATV it must be the case that Cable makes television a more attractive entertainment medium. If viewer's valuation of television increases because of Cable we would expect that they would either watch more television or watch television more intensely or some combination of these two behavioral changes.

We measure the change in viewing habits brought about by Cable in several ways. First we investigate the relationship between changes in viewing habits and changes in Cable penetration (the percentage of homes in a locality which subscribe to Cable). We expect that those areas which experience large increases in Cable penetration will also experience large increases in television viewing due to the greater diversity of programs available with Cable. This is not the case, however. We find no relationship whatsoever between these variables.

In a second test of the same hypothesis we examine the relationship between the level of Cable penetration in an area and the amount of time people spend watching television. Once again, no relationship is found, contrary to our expectations.

Since viewers obviously value CATV we must conclude that if they don't watch more television then they must get greater value from the programs that they watch. With the greater diversity of programs brought about by Cable we would expect that viewers would be more likely to find a program which more closely matches up with their tastes in any given time slot. This is the final hypothesis which we test.

Viewers paying close attention to their televisions are more likely to be receptive to television commercials than those viewers who are paying less attention. If one is not following the plot of the program it seems unlikely that one could be aware of the content of an advertising message. Therefore, we would expect advertisements to be more effective with attentive viewers and advertisers would value these advertising time slots more highly. Thus Cable, to the extent that it increases viewing intensity, should increase advertising revenues.

The empirical implementation of this hypothesis requires comparison of television advertising rates and the percentage of viewers on Cable for different stations. The latter variable is not directly available. Fortunately, we are able to find a proxy for this variable which is available. This proxy, known as the Herfindahl index, is normally a measure of market concentration. It is related to cable penetration because people on Cable tune to a greater variety of stations and thus the concentration of leading stations in the market is lower than for areas with less Cable usage.

The relationship between the Herfindahl index and advertising rates (after taking account of the influences of many other variables) is quite strong (statistically significant). High Herfindahl indices (which imply low Cable penetration) are negatively related to advertising rates. This, of course, means a positive relationship between advertising rates and Cable penetration. We estimate that Cable is responsible for a 19.6% increase in advertising revenues. This result includes any influence of the local/distant audience relationship. This finding of the beneficial impact of Cable on advertising revenues is the key result of this paper. It is contrary to the assumptions made by those who have focused only on market fragmentation and proposed copyright payments imposition on CATV because of this focus.

Additional evidence is gathered in support of this last finding. Examination of advertising revenues over time does not indicate a negative impact of Cable. Interprovincial differences in advertising rates are shown to be positively related to Cable penetration. We thus have several pieces of evidence supporting our conclusion that CATV increases advertising revenues. The policy implication of this result is that there is no justification for imposition of copyright payment on Cable systems.

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Introduction

The purpose of this study is to investigate the economic impact of proposals to have Cable television pay copyright fees for their retransmission of television signals of over the air broadcasters. Cable companies usually own a large antenna (headends) or sometimes microwave relay systems with which they receive television broadcasts and they retransmit these broadcasts through trunk lines (cables) which carry signals to individual households. They charge a monthly fee for this service and usually an initial installation fee as well. Cable companies are also known as Community Antenna Television (CATV).

Households pay for this service because they are able to receive more and higher quality broadcasting signals than was previously the case. Cable companies usually carry some of their own programming which might be weather and news headlines, stock market tickers or local broadcasting. While these latter endeavors might have a positive effect on the value of CATV to subscribers, it is most likely negligible since viewers do not seem to watch this programming to any non-negligible degree.

Cable companies in Canada are not free to import any broadcast which they wish. The CRTC has imposed rules specifying a priority system of stations which the cable companies are required to obey. Cable companies must carry all local stations (with preference given to CBC and educational stations) before importing any distant stations. There are also rules regulating the order in which distant signals can be imported with the CBC and educational stations again receiving preferential treatment.

Our analysis occurs within this institutional framework. Our work can be separated into two major parts. First we examine theoretical aspects of proposed legislation regarding retransmission of broadcasts. The strengths and weaknesses of our present system of supporting broadcasting

through advertising revenues is examined. An analysis of various copyright proposals suggested by Keyes and Brunet, The Economic Council or other interested parties is undertaken within the above framework. We shall see that the rationales behind these proposals are very similar and are based on untested empirical assumptions. We then examine the potential impact of Cable on broadcasting revenues.

The second half of this paper is empirical in nature and is an attempt to estimate the magnitude of some of the effects discussed in the first half. First the data are described. Then we measure several relationships which underly the basic relationship between CATV, broadcasting revenues and copyright payments. The results do not support the rationales behind proposals to have CATV operators make copyright payments for the retransmission of broadcasts.

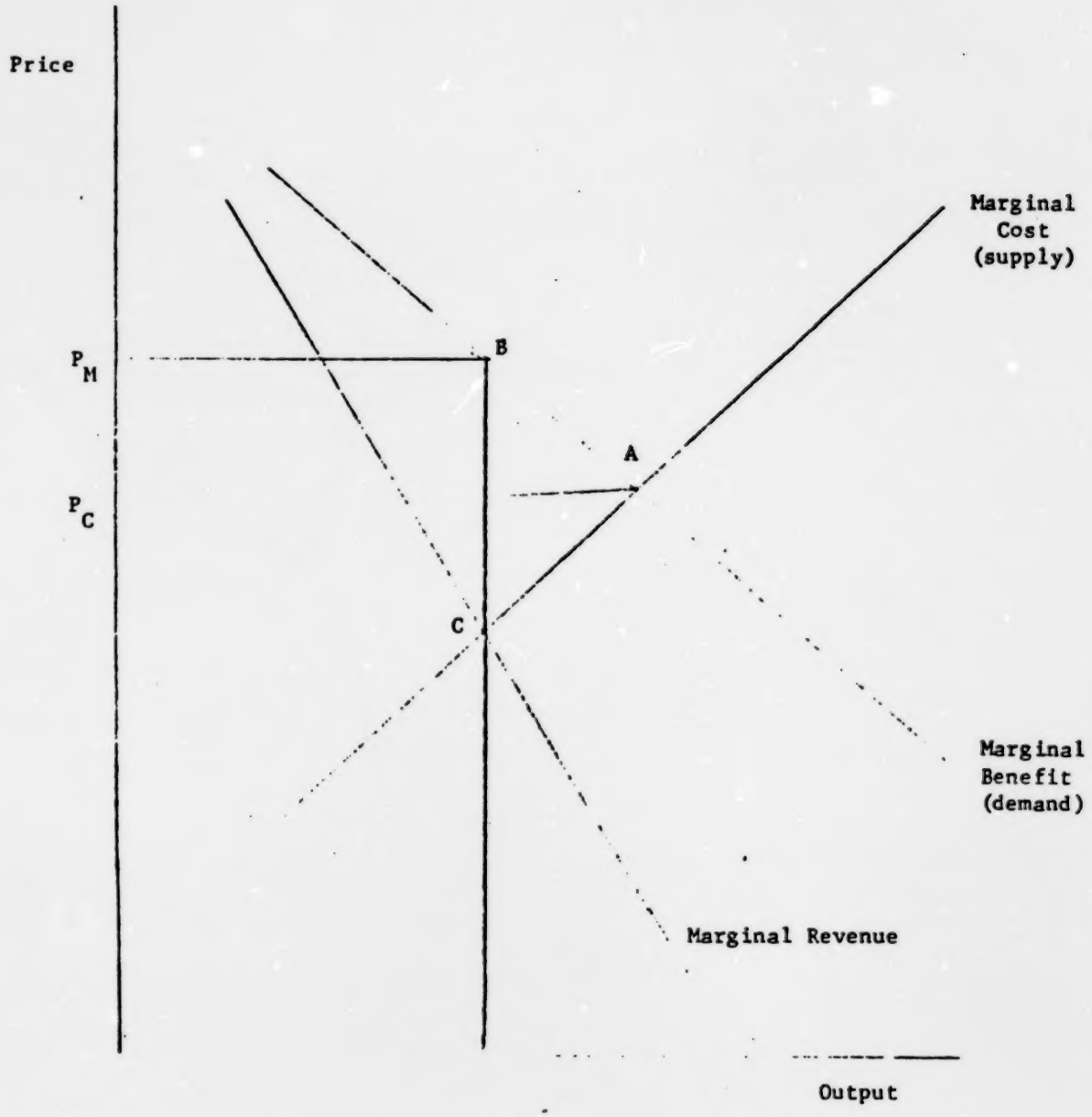
Payment by Advertising

Our primary focus in this paper is to determine the impacts of various copyright proposals on the major parties involved. One of our concerns is the impact of these proposals on the well being of the public. In order to make this latter assessment we will use some traditional techniques found in economic welfare theory. We shall assume that the public is benefitted when a proposal increases efficiency and thus total wealth of the public. This public impact is divorced from any particular impact on various members of the public, some of whom may be worse off even though the public as a whole are better off. The concept of Pareto optimality is implicit in this technique. Pareto optimality is a state where no one can be made better off without making someone else worse off. This can only occur when goods are efficiently produced.

The efficient production of a good requires that it be produced if the total benefit is greater than the total cost and that it be produced up to the point where an additional unit imposes greater costs than the benefit created. (Point A in Figure 1.) In the case of copyrights we wish to reward copyright holders to the extent that all works whose value exceeds the cost of production are produced. Giving a monopoly to a copyright holder is an attempt to allow him to extract as much of the value of the good as possible from the public.

Once the good has been produced a monopolistic copyright holder will cause losses to society by refusing to reproduce the items in the most efficient quantities. The profit maximizing price (point B in Figure 1) causes an output less than that at which the production costs just equal the value of an

Figure 1


Price
Marginal Cost (supply)
P_M
B
A
P_C
C
Marginal Benefit (demand)
Marginal Revenue
Output

additional unit. The loss to society is equal to triangle ABC. The dilemma of copyrights is that removal of this inefficiency is likely to reduce the production of copyrighted works since the benefit perceived by the potential copyright holder has been diminished. Thus we have either an inefficient creation of copyrighted works or an inefficient distribution of these works once they are created.[1]

The market for television broadcasts is unique in many respects. Television broadcasting has many of the attributes usually found in public goods. Public goods are defined as those goods where one person's consumption does not diminish anyone else's consumption. For this reason it is dissimilar in many respects to normal goods and is analyzed in a somewhat different manner.

The efficient provision of public goods is not easily achieved. If potential users can be excluded from consuming the good, a price mechanism can be effective in collecting revenue. With perfect information, a multiple part pricing mechanism (perfect discriminatory pricing) could collect revenues equal to the total value of the item in question with no potential users being excluded. This is an optimal solution in an optimal world but the assumption of perfect knowledge is patently false.

Demsetz has shown that exclusion of potential customers may be efficient in a world with transactions costs. He has also demonstrated the feasibility of producing public goods privately. The present system of provision of TV shows is primarily private. There are several major problems with the financing of TV shows with the present institutional arrangements.

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[1] This topic is well known in the literature. For more detail see Chapter 3 of the Economic Council of Canada's Report, Chapter 2 in Keyes and Brunet or Chapter 16 in Scherer.

Television revenues are now derived from advertising revenues. This method is inferior to the normal price mechanism in responding to viewer wants. This problem stems from two main factors. (1) Viewers can't express the intensity of their desire to watch particular shows and (2) the advertiser's customers may not contain the total audience. Conversely, people who pay for a show may not value it at all.

The first point arises because of the information available on audiences. The television rating services basically measure only whether a particular household or person watched a particular show. The degree to which a person values the show is unknown. With a price mechanism the value of a show to a person is revealed in the price he is willing to pay for it.[2]

The second difficulty has to do with the fact that certain members of the audience may value the TV show very highly and yet no advertiser may particularly feel it efficacious to appeal to the viewers who may not react, say, to advertising messages. If a particular show appeals to many members of the audience who are not influenced by advertising the mismatch of audience and advertisers may lead to a lack of advertising revenue on the part of the broadcasters and eventual removal of the show from the air.

A further problem with the present system has to do with the fact that many beneficiaries of advertising (those who watch shows supported by advertising) do not pay for the advertising (by buying the advertised item which is priced to cover advertising expense) whereas many of those who pay do not receive the benefits. However, no one is excluded from the present system. With pay TV some viewers who do not value the program sufficiently

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[2] In fact, we shall later see that advertisers are in fact aware of the intensity of viewership. This is not necessarily true between shows but between various geographic areas they appear to be aware of distinctions.

to pay the price will be excluded from watching. Since there is no extra cost to society in letting this person watch, it is thought to be more efficient not to exclude anyone. This is one of the few advantages of the present system.

Since the value of a show to society may be quite different from what advertisers pay for it, creators of a show might not feel properly rewarded.[3] However, if advertisers pay too little the supply of shows will not equal the demand and the price will rise. This is known as a disequilibrium situation.

It should be remembered that there are many goods whose value to society is not fully reflected in the price or revenues generated by the good. The diamond-water paradox is a well known example of this. Water is clearly of more value than diamonds and yet water commands a lower price. This is due to the greater scarcity of diamonds relative to water. The scarcity of a good is a prime determinant of the price.

All in all it seems fair to say that the present system of television payment through advertising is quite inefficient. A system of pay TV could in principle alleviate many of the problems. This alternative is not one to which we shall devote much time. Further discussions will measure the deviations from the present systems caused by copyright proposals. We shall not be questioning the efficiency of payment by advertising again. We assume that the present system is working fine prior to the introduction of CATV television.

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[3] This likelihood is mitigated by the fact that substitutes such as movies exist and if a show is much more valuable than advertisers are willing to pay it will most likely find one of these other outlets to be more attractive.

An Analysis of Various Payment Schemes

In order to analyze proposals put forward by Keyes and Brunet, the Economic Council and others we must have an understanding of their intent. Copyrights are given by the government in order to reward individuals for their creative efforts. By giving these individuals a monopoly on their work the government has allowed these people to reap the maximum reward for their efforts. Assuming that this is a wise policy, we will concern ourselves with the preservation of these rewards and the impact of CATV on these rewards.

The compensation that copyright holders of television programs receive is determined to a large extent by the advertising revenues generated by the program (see the section 'Transmission of Advertising Revenues' below).

It is argued by proponents of copyright legislation such as Keyes and Brunet that CATV will reduce these advertising revenues and copyright payments. The payment systems discussed in this section are all attempts to prevent CATV from reducing advertising revenues.

It is thought that CATV will reduce advertising revenues because of 'market fragmentation'. Market fragmentation (discussed more fully in Part II of this paper) occurs when viewers stop watching local shows and start watching shows which originate from distant areas when Cable makes these distant shows available. The advertisers in these distant areas are thought to value these local viewers less highly than local advertisers, leading to a net reduction in advertising revenues. Under this scenario the increased advertising to the distant station is more than offset by the decrease in advertising to the local station.

Some copyright proposals take this argument into account and propose that Cable companies only pay copyright fees to the extent that they are responsible for fragmenting the audience. These proposals (signal coverage, the Economic Council Solution) specify conditions under which payments will

or will not be made. Other proposals (compulsory licensing, joint payment, strict copyright) are basically concerned with developing a workable system of payments and do not differentiate between instances where cable decreases advertising revenues and those when it does not. All proposals take for granted the supposition that Cable does reduce advertising revenues. Testing this supposition is our task in the second half of this paper. In the following analyses we shall assume that Cable does decrease advertising revenues.

Signal Coverage

This proposal attempts to impose copyright payments on Cable companies only to the extent that they decrease advertising revenues. Under this proposal the increases in 'distant' audiences due to Cable are measured and copyright fees are a function of the increase in distant audience.

As defined by Keyes and Brunet:

> "Under this system, where a cable service duplicates the signal coverage of a local broadcast, no payment would be made; where the cable system extends the audience reached by the signal of the broadcast, provision for payment would be made only to the extent of the increase. The theory is that broadcasters pay royalties, through negotiations prior to broadcast, on the basis of broadcast revenue to be derived from the "normal" reception market area."[4]

The payment referred to in the above paragraph would be determined by the copyright tribunal. Deletion of advertising would be considered tantamount to extension of the audience (even to a local audience) and royalties would be charged to Cable companies.

The comments regarding rediffusion of local broadcasts are easily understood. As long as CATV rediffuses the local programming intact in all forms, customers of CATV merely benefit from superior reception. Local advertisers

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[4] See Keyes and Brunet, p. 141.

should value any additional local Cable viewers as equivalent to local non-cable viewers. It is reasonable to expect that advertisers will compete more aggressively for time slots in the programming and that the advertising rates (price) and revenues will be bid up. Under most reasonable conditions (which we shall detail below) we would expect the higher advertising revenues earned by the stations to be passed on (in part) to the creators of television programming.

The provision whereby payment would be made for that part of the audience which was newly reached due to CATV makes sense when the newly reached audience is less valuable to advertisers because they are far away. It should be made clear, however, that the definition of extended audience includes only that part of the audience which lies outside the natural broadcasting sphere of the television station. Increases in audience brought about through increased viewership within the broadcasting sphere (e.g., due to better reception on Cable) should not be considered an extension of the audience since no station is losing these local viewers.

In fact we have come to the major problem with signal coverage as defined by Keyes and Brunet. The purpose of signal coverage is to eliminate any negative influence of CATV on advertising revenues. When local viewers from the audience of a local station switch to a distant station local advertising revenues fall.[5] Signal coverage does not measure the loss of viewers to local stations but instead it measures the gain to distant stations. The two will only be equivalent if there is no change in viewership at all when CATV is introduced. Signal coverage would make more sense if it measured the gain to distant stations which came from local stations instead of just the gain to distant stations.

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[5]Part 2 is concerned with measuring these effects.

The extension of the audience into more distant regions will reduce the revenues to television stations and producers of programs if the distant (extended) audience is worth less to advertisers than the local audience. In order to prevent CATV from reducing revenues to copyright holders it would be necessary to charge a copyright fee (to the offending cable company) equal to the difference between the valuation of the extended audience to advertisers in the city of program origination and the valuation of this audience to the advertisers of the local stations which lost them. The empirical work in Part 2 will enable us to determine the different valuations placed on local and distant stations.

If CATV deleted advertising messages the connection between audience and payment for viewing would be completely severed.[6] In this case the audience watching on CATV would be classified entirely as an 'extended audience'. Advertisers will not value these viewers at all and broadcasters and program producers will lose much more revenue than would be the case with simple extension of the audience and the accompanying fragmentation of the market. In this case payment by the cable companies should be equated to the total value of the CATV audience to advertisers before these people were given the option of watching CATV.

An interesting situation would arise if the cable companies are allowed to delete the original advertising. Under signal coverage they are to be charged an amount equal to the lost advertising revenues caused by CATV. Cable companies must somehow generate enough revenue to make these payments.

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[6] Under present regulations this behavior is not allowed. It is also the case that cable companies are not allowed to sell their own advertising although we will analyze this possibility. The government also regulates the monthly fees charged by cable companies.

If cable companies were previously earning only normal profits they would be forced to conduct business in a somewhat different manner if they wished to keep solvent. If they delete all advertising they can either raise CATV rates if viewers prefer to avoid advertisements or sell the slots on their own. The alternative chosen will tend to depend on whether viewers value the lack of advertising to a greater or lesser extent than advertisers value the time.[7] If cable companies are forced to pay for a reduction in advertising revenues they should be allowed to sell advertising themselves if it increases total revenues. In this way those who value the advertising time the most will get it. To disallow this possibility reduces society's welfare.

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[7] We use the term 'tend' in the last sentence because the value of a product is not equal to the revenue it generates and sometimes that good which generates the greatest revenue does not yield the greatest value.

Joint Payment

This is a rather vague proposal to require copyright owners and broadcasters to take account of the impact of CATV while negotiating the broadcasters' copyright payments. According to Keyes and Brunet:

> "Another solution would be to require copyright owners and broadcasters, when negotiating for authorization to broadcast, to take into account the possibility of a broadcast being rediffused by cable systems. It is possible to envisage a provision in the copyright law requiring that any broadcasting fee negotiated between copyright owners and broadcasters reflect the larger audience reached by rediffusion of the broadcast signal. In turn, cable systems could be required, under the Broadcasting Act to reimburse the broadcaster for the additional cost of paying for the cable audience." [8]

This proposal seems unmanageable and unnecessary. If the rediffusion of CATV increases the audience we would expect advertisers to be willing to bid up the price of advertising slots. If the new audience is not worth anything to advertisers, broadcasters would not be willing to pay a larger amount to copyright holders. The value of the additional audience should be reflected in the price established between the broadcasters and advertiser without any special provision for CATV.

Forcing the broadcasters to pay more and reimbursing them by taxing the CATV operators could lead to some economically inefficient and bizarre situations. For example, assume that the broadcaster negotiates the rates with the copyright holder. If he can pass any additional payment off to the CATV operator he will have no incentive to bargain for a low price. This will lead to the CATV operator being squeezed for as much as he can give by the copyright owner. There are forces at work to prevent this situation

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[8] See Keyes and Brunet, p. 142.

from occurring. The CATV operator can pay the broadcaster to bargain more effectively in the CATV operators' interest. Of course the copyright holder can also pay the broadcaster to bargain ineffectively (from the CATV perspective). The fact that the broadcaster and copyright holder jointly are in a position to squeeze any profits from the CATV operator makes it likely that the CATV operator will be pushed to the limit.

A profit-maximizing union of the copyright owner and broadcaster has two possible strategies. The first is to remove all profits (economic profits exclude the normal return to an investment) from the CATV operator. In this case the CATV operator will stay in business and the increase in wealth to the two partners will be equal to the present value (discounted value) of the future stream of payments into the indefinite future. On the other hand, the partners can maximize the CATV's short-run payments by reducing his revenues to the point where he is just covering his average variable costs. In the case of CATV, where there are long-lived fixed costs (e.g., the trunk lines and major antennas carrying the signals) this may have the effect of extracting considerably more revenue than the first instance even though it will not last indefinitely. When it comes time for the CATV operator to replace his fixed capital he will shut down and go out of business. The fact that this may not happen for a long time makes it likely that this will be the optimizing strategy for the broadcaster-copyright holder team. If the cable company was not earning any economic profit to begin with we can be sure that the latter strategy would be the one picked by the negotiating partners.[9]

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[9] The CATV operator is not able to fully pass on these additional costs because the demand for his product is not perfectly inelastic. As his price is forced up fewer people will use the CATV and this will reduce his profits. If this were not the case he could raise his price and profits to infinitely high levels at his discretion.

It is not always the case that broadcasters will maximize their profits, as a group, by removing all profits from CATV. Broadcasters, as a group, may benefit by driving out some CATV's and collecting higher prices from the remaining CATV's if the reduction in CATV companies increases the price which can be charged by CATV companies. This does not seem realistic, however, as CATV companies do not generally compete for the same audience and removing some CATV's will not influence the price which others can charge.[10]

It is not in society's best interest (as far as its total wealth) to allow the broadcasters and copyright holders to drive the CATV's out of business. In the case where CATV profits were driven to zero we merely had a redistribution of wealth from CATV operators to broadcasters and copyright holders and there are very few positive welfare implications which we can make. The presence of economic profits in the CATV industry could be indicative either of monopoly power or of a disequilibrium situation. If it were indicative of monopoly power we would wish to increase the competition between CATV operators so that a more optimal amount of CATV services would be produced.[11] Transferring the profits would have no particular deleterious effects. However, if the profit were indicative of disequilibrium, where profits act as a spur to new productivity, the transfer would have a detrimental effect and should be avoided if possible.

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[10] We must also remember that CATV subscriber rates are regulated and can not be raised at will. In addition, if broadcasters collude the government may use anti-combines legislation against them.

[11] Government regulation is another possible solution although a difficult one to manage properly.

Instead of assuming that broadcasters negotiate with copyright holders, a more realistic scenario might be to have the government determine, through a formula, the increase in price which the copyright holder could charge and which the CATV must pay. It is unlikely that there would be any benefit in having the broadcaster act as a middleman in this instance. Such a system is obviously not one of "joint payment" and belongs under the rubric of either compulsory licensing or strict copyright payment.

Compulsory Licensing and Strict Copyright[12]

The system of compulsory licensing is one where users of copyrighted material pay for its use without negotiating with copyright holders directly. Instead, a tribunal determines the appropriate fees for the use of a work and anyone wishing to use the work may, as long as they pay the license fee. The fee may be paid into a general fund and not directly to the copyright holder.

The 1976 General Revision of the Copyright Act in the United States imposed compulsory licensing of copyrighted television programs with respect to use by CATV television systems. The CATV systems are required to pay a specified percentage of revenues to the Register of Copyrights and these proceeds are distributed to copyright holders in some unspecified manner. It seems reasonable to assume that compulsory licensing for Canadian CATV operations would have many features similar to the U.S. law.

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[12] Compulsory licensing is a particular type of copyright payment system. Full copyright liability implies that copyright owners negotiate the prices for use of the copyrighted materials with each user. Compulsory licensing, as explained in this section, eliminates the need for these negotiations and thus is analyzed along with full copyright liability.

Compulsory licensing has several advantages and disadvantages in comparison with a private right to exclude being granted to the holders of copyright. The right to exclude, implied by strict liability, means that a cable system cannot retransmit a particular program without the permission of the copyright holder.

The major advantage of compulsory licensing is the reduction in transactions costs brought about through the elimination of the bargaining process between copyright holders and those wishing to use the copyrighted work. The cost of these transactions is unknown and estimates by those studying the problem vary. From Johnson (p. 17)

> Not only would fees paid to copyright owners constitute an added cost to CATV operations, but CATV operators assert that the sheer mechanics of the clearance process would be formidable,..... Clearance on a continuous basis for several channels allegedly would require massive paperwork--a potentially serious burden.

On the other hand:

> If full liability for retransmission had been imposed, then contracts and institutions would have developed to facilitate negotiations. Independent stations do manage successfully to complete negotiations for programs for their broadcast day... . The use of selling and purchasing agents...could exploit the economies of scale to...reduce negotiation costs. (p. 29, Besen, Manning and Mitchell.)

Regardless of the magnitude of these costs, their elimination is clearly a good thing. What then are the disadvantages of compulsory licensing?

A fundamental weakness is that the license fee need bear no resemblance to the market value of the program. If license fees are inflexible some shows which have license fees below market valuation which the public would wish to have broadcast and carried on CATV won't be, and in other cases when the value of the show to CATV viewers is greater than the license

fee the copyright owner will not be able to capture the difference.[13]

For example, assume that the value of the retransmission was such that consumers would be willing to pay an amount much greater than the licensing fee and other costs. If the amount broadcasters are willing to pay plus the license fees are below the costs of production the program will not be broadcast or rediffused and both copyright holders and the viewing public would be worse off than if a copyright fee more than the license fee could be agreed upon.[14] (See B.B.M., p. 28.)

On the other hand, assume the value of the retransmission was greater than the license fee. The copyright owner has no chance of getting a higher price because he has lost the right to exclude. Under a system of strict copyright liability, the copyright owner would have a chance to gain some of the additional revenue by threatening to exclude the CATV system. This would benefit the artistic community. This would be a case of increasing the financial incentives for creative work without decreasing the distribution of the copyrighted good.

This leads to our next point. Copyright liability allows for the setting of various prices for retransmission. Compulsory licensing only allows for a fixed price (or set of prices). Compulsory licensing will reduce retransmissions if the license fee is increased, say, in the desire to increase rewards to artistic effort (assuming the license fee is below the monopoly level). Strict liability allows price discrimination to

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[13] See Besen, Manning and Mitchell, p. 28.

[14] This merely says that imposing a fixed price hurts both producers and consumers. If automobile prices were set at $4000 producers of Cadillacs would stop production and many Chevette customers would no longer wish to buy the former car of their choice.

achieve the same ends (increased revenues) without reducing retransmissions.

There are other problems with compulsory licensing. The mechanism which will determine the license fees will not likely be as flexible as market negotiations, because the royalty tribunal will not have the same incentives as the market participants. It is also possible that a license fee will be set which will bear little relationship to the market value.

An example of this can be found in the present Canadian copyright law. A compulsory license was given to sound recordings under the terms of the 1921 Copyright Act. At that time a license fee was established which remained in effect for more than 57 years even though prices and conditions in the recording industry have changed radically over the last half century. We even find the royalty being negotiated in some cases. (See K and B, p. 101.)

Another more important objection has to do with the distribution of the license fees. The reduced transactions costs brought about by using compulsory licensing are due to the fact that the relative value of individual programs is not negotiated. When license fees are distributed it is unlikely that the split will reflect the appropriate market value of the shows. The creators of popular shows would most likely wish to get a larger share of the pie than average. Compulsory licensing proposals don't seem to address this question.

This distribution problem is not absent in other uses of compulsory licensing. For example, with respect to sound recordings, the license fee is paid directly to copyright holders under Canadian law. [Why CATV payments under the U.S. compulsory licensing law for CATV are not sent directly to copyright holders is a puzzling question.] Under Section 19 (6) the law states that if there is more than one copyright holder on the side of a

record, they will share the payment equally. This arbitrary distribution is likely to make some copyright owners distraught, but not to the same degree as television program copyright owners. This is due partly to an informational difference between these two cases.

Copyright holders on songs don't usually know to what extent their song was responsible for the sales of a record. When an artist picks songs for a record he usually picks a combination of songs that will do well together. In addition, records tend to be sold based on the performance of a song; as well as the song itself and few copyright holders could demonstrate that their song was responsible for the success of a record. Television copyright owners have more information on which to form an opinion. The rediffusion of a show does not alter the content. Several rating services give information on the popularity of various television programs. From these ratings the copyright owners can judge whether their show is more likely than other shows to induce people to purchase a CATV service. The range of popularity of various shows is probably greater than that of songs on a record (of which there are usually less than five on a side) and thus there is more likely to be resentment by copyright holders of popular shows over an equal distribution of license fees for television copyright holders.

It is quite apparent that compulsory licensing has both advantages and disadvantages. If it were found that the transactions cost savings were in fact of a small magnitude a system of strict copyright liability would be preferable as far as rewarding creators of shows most highly valued by consumers. It would also lead to more rediffusion and greater royalty payments. Whether greater royalty payments are beneficial to society is another question altogether which we shall answer in Part 2.

Economic Council's Solution

The Economic Council proposed that CATV not pay royalties for rediffusion of unaltered television signals with advertising. When advertisements are deleted, or for programming with no advertisements, it was recommended that the CATV systems be liable for copyright payments, though the form of these payments was left unspecified.

The Economic Council was aware that advertising revenues reflect audience size and implicitly assumed that the market fragmentation caused by CATV would not greatly alter advertising revenues. They felt that this result was likely because those advertisers who value fragmented audiences the most (national advertisers) can replace local advertisers if the audience becomes fragmented. This position is reasonable but in fact may or may not be empirically true.

The argument for royalty payments when advertising is deleted is sound. With no advertising messages in the rediffused program advertising revenues would be lower than would be the case without CATV. Broadcasters and copyright holders would both be hurt by a policy of commercial deletion. If the cable company replaced the advertisements with its own advertisements, its revenues would increase. The cable company would, in this case, be free riding and this is not an efficient situation.

For rediffusion of non-commercial television the arguments are somewhat different and the Economic Council is not correct. The Economic Council says: "...where the cost of the wireless broadcast was not carried by advertising the cable company might be required to provide appropriate recompense to copyright owners... ."[15] Non-commercial TV which is paid for out of voluntary contributions need not be compensated for royalty loss since its royalties

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[15]Economic Council Report, p. 176.

were non-existent to begin with. All viewers have the choice of being free riders and there is no reason why CATV viewers should not be allowed to free ride also. The production of these shows may not be efficient but it is the nature of non-profit institutions that the level of output they produce bears little relationship to market solutions.

An exception to this might be a case of local programming which is sponsored by a local government. In this case the local viewers do pay for the show when they pay taxes and if we aggregate people into communities we could say that other communities shouldn't get a free ride at this community's expense.

The Economic Council solution begs the question as to the appropriate form of copyright payment in those cases where copyright payment is mandated. Our other sections cover this question.

The solution proposed by the Economic Council makes an assumption which is the opposite of that made by the proponents of signal coverage. The Economic Council assumes that the value of new audiences to advertisers is negligibly different from the value advertisers place on the old audience. Signal coverage makes sense under the assumption that the new audience has a zero value to advertisers. The truth probably lies between those extremes and we will test this proposition in the next chapter.

The Keyes and Brunet Solution

Keyes and Brunet recommend a 'rediffusion right' in broadcasts. This solution is a contrivance to avoid copyright payments to non-nationals while increasing such payments to Canadians. This potential avoidance is made possible by the international copyright conventions to which Canada subscribes.[16] Copyrights for programs are covered under these conventions so that Canada must treat nationals and non-nationals alike. Broadcasts are not covered by the copyright conventions to which Canada subscribes so it might be possible, in theory, to grant domestic broadcasters rediffusion rights without doing the same for foreign broadcasters. Keyes and Brunet are quite forward in stating their objective:

> It is submitted, however, that it is possible to arrive at a solution that respects Canada's international commitments and abides by the principles of copyright law, yet does not increase the present imbalance of international copyright payments.
>
> K and B, p. 142

These payments are to be paid in a manner analagous to compulsory licensing. Keyes and Brunet envision the payments of cable companies being made to a central body which distributes the proceeds among the broadcasters. Keyes and Brunet propose that this tribunal assure that some of the proceeds go to the (Canadian) program suppliers.

Keyes and Brunet assume that CATV reduces revenues to program suppliers (and broadcasters). They do not detail the extent of this loss nor the appropriate amount of royalties to be paid by CATV operators. Their main concern seems to be focussed on increasing domestic program suppliers' revenues without violating international copyright laws. The major economic issue involved is not a primary consideration to them. In addition, Keyes and Brunet propose that Canadian Broadcasters only receive royalties for the Canadian content of their broadcasts.' This will increase the value of Canadian shows to

[16] Whether or not Canada can avoid these payments is a contentious question. Barry Torno, in a paper prepared for the Federal Government Interdepartmental Copyright Committee, has cast doubt on this possibility. Brunet, in a paper for Rogers Cable Television, also recently rejected this as a viable plan.

broadcasters and will reduce the value of these shows to CATV operators. The CATV operator could avoid copyright payments if he refrained from retransmitting Canadian shows. Under present CRTC regulations which do not allow unauthorized signal curtailment this is not a viable option.[17]

Since they appear to favour a compulsory license type of solution this would appear to be the appropriate framework in which to judge the economic impact of their proposals. It is different from our previous analysis of this payment type only because the beneficiaries are the broadcasters and not the program suppliers. This will have the effect of reducing payments to program suppliers to some level below the amount of copyright payment by CATV operators. This will be the case because broadcasters will need to be compensated for the cost of their involvement in the system and because the broadcaster is unlikely to pass on the entire increase in revenue to program suppliers. The degree to which the additional revenues are passed on is dependent on how the disbursements of the copyright tribunal are made.

If the payments are divided equally among broadcasters, an individual broadcaster would have no increased incentive to purchase more popular programs and the copyright disbursement would not increase his demand for programs nor the price he pays for them. He would tend to keep this payment and not have it influence his decisions since it is equivalent to a lump sum payment (or tax). Only if his disbursement is a function of his behavior will he change his behavior. For example, if payments were a function of audience size (on cable) we would expect competition among the broadcasters in an attempt to increase their audience and this will increase their demand for programs and much of the copyright payment would be passed on to program suppliers. Thus Keyes' and Brunet's proposal to force broadcasters to pay program suppliers might not be farfetched although how it would be implemented is uncertain.

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[17] See 1976 Cable Television Regulations, p. 8

Other Forms of Payments

Central to all the previous proposals was the belief that program creators (the artistic community) were underpaid for their services. The particular cause of underpayment was thought to be the introduction of CATV. Implicit was the belief that it was at least necessary to bring the payment level back to that which would exist under the system of advertising without CATV. All of the proposals above are capable of achieving this result although with varying impacts on other segments of the economy. We know that a sufficiently high royalty will either succeed in raising the necessary revenue or driving CATV operators out of business. If the latter possibility comes about the payment level will be equivalent to the original since there will be no CATV to change revenue patterns.

All of these proposals have attempted to charge the cable companies (and thus the viewers) for use of the programs. This result is seemingly more in line with traditional efficient allocations than is the case with over-the-air broadcasting. As mentioned in an earlier section the viewers of over-the-air television do not pay for their use of the programs except in their role as product consumers. The burden is then spread around in a manner which is randomly related to use (except to the extent that the advertising greatly affects consumption habits).

We thus find ourselves in somewhat puzzling circumstances. The over-air television market does not charge only consumers of programs. Other segments of the community help pay program suppliers. Under the various copyright proposals discussed previously the users of CATV are charged for their viewing of a show. Thus over-the-air viewers are treated in a manner dissimilar to CATV viewers. There is a way to bring back the status quo, if we so desired.

CATV viewers would be treated the same as over-the-air viewers if the government were to raise the requisite royalties (previously to be paid by CATV) by taxing television advertisers. The tax could be a function of the amount of television advertising. If this were done advertisers, and thus the customers of the advertised products, would pay for the program as they would without CATV. The only difference (aside from the costs of administering the taxes) would be that the advertisements would be less attractive than they were prior to Cable and the advertisers might switch to other advertising mediums. All television viewers would be treated the same under this proposal (none pay directly for the programs) even though as a general principle we would want viewers, and not the public, to pay for the programs.

A second way to equate these two types of viewers is to go to a system such as that used in many other countries whereby owners of televisions are taxed a flat amount when they purchase the television with the proceeds being used to finance television programs and broadcasts. The disadvantage of such a system is that the government must then disburse these revenues among television broadcasters and/or networks. Conceivably, however, the money could be doled out to stations or networks based on the number of viewers reported by the various measuring institutions such as Neilson or B.B.M. In this latter case the programming would most likely be similar to that which now exists with advertising with the viewers of television footing the bill instead of the consumers of advertised products.

Another form of payment would be a direct government subsidy to copyright owners. The payments would then be shouldered by taxpayers. In addition, we do not know how the government will decide the amount of royalties

to give or the manner in which it is to be dispersed. This system suffers from the flaw of not having the group that pays being correlated to the group that benefits (viewers of television). It also suffers from the additional flaw of not allowing citizens to avoid these payments. (Under payment by advertising citizens can patronize brands which don't advertise if they wish to avoid paying for television broadcasts.) We might say that from a welfare perspective this system contains the worst of all worlds except that the collection of revenues is not very costly.

The major advantage of direct government subsidy is that all of it goes to Canadians. This is opposed to non-discriminatory copyright payments which will go primarily to foreigners. Of course, a tax on televisions could also be disbursed entirely among Canadians and this would still appear to be a much superior solution.

Transmission of Advertising Revenues

In the previous sections we have been concerned with the impact of CATV on the advertising revenues of broadcasters. Much of the discussion regarding copyright legislation has been concerned with protecting the revenues of the creative community. For example, Keyes and Brunet state:

> It is submitted, however that there is no reason why a broadcaster should act as bargaining agent on behalf of copyright owners. Furthermore, even if a broadcaster did obtain a better price from a sponsor, on the grounds of increased coverage, there would be no guarantee that such increase in revenue would be passed on to copyright owners.[18]

Because of the evident confusion regarding this point it seems worthwhile to discuss the interactions of the broadcasters and the copyright holders in more detail.

Broadcasters have a derived demand for television shows. By derived demand we mean that these shows are used as a means to an end--that end being the creation of profits for the broadcasters. Broadcasters base their value of a show on its ability to attract large viewing audiences and raise advertising revenues. We can represent the markets for programs in Figure 1. Panel A shows the demand (dd) for programs for an individual broadcaster. He would be willing to pay a high price for the first few shows because he can show these during prime time and earn a great deal of advertising revenue. Additional shows are worth less to him because he must show these

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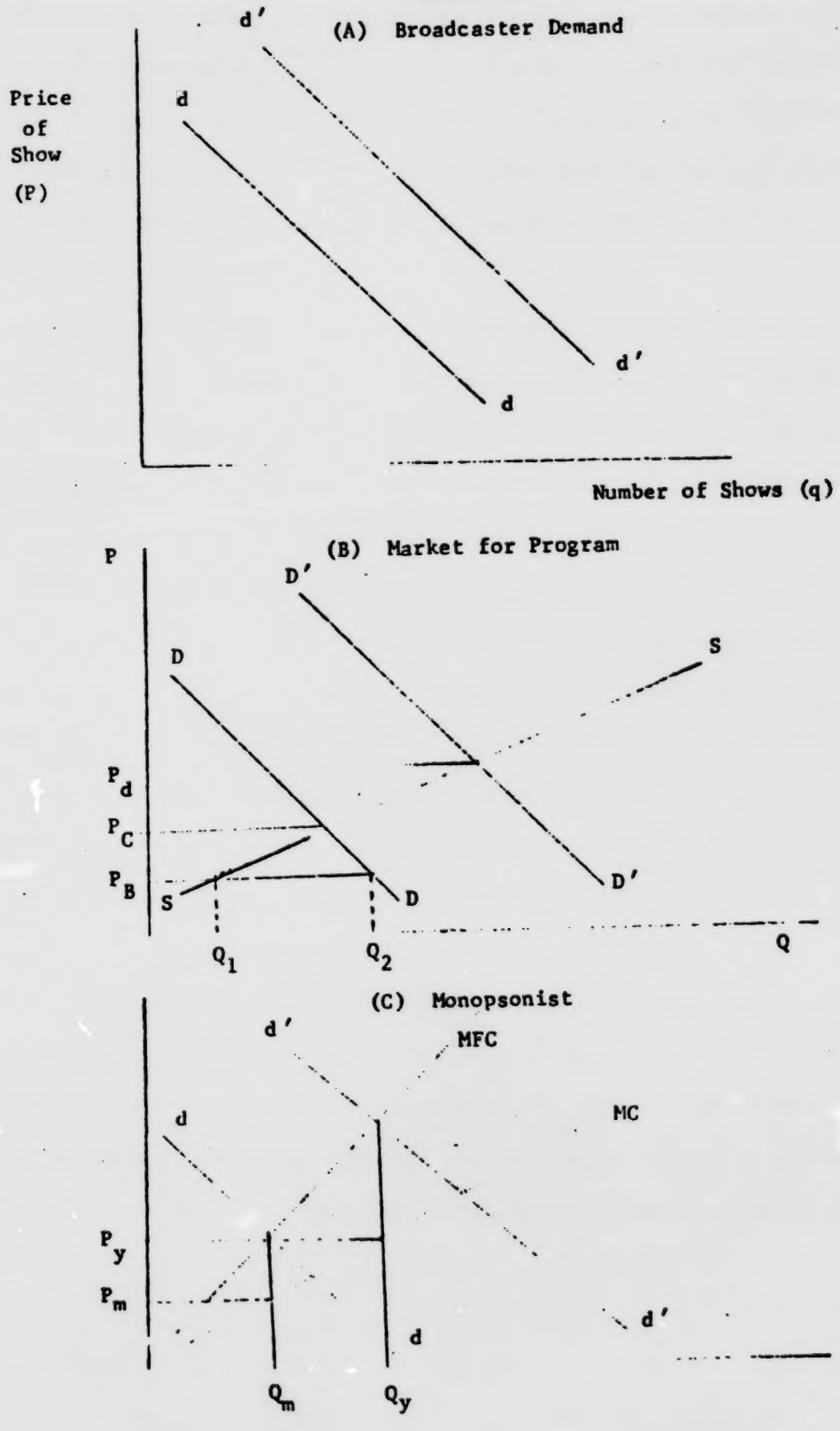
[18] See Keyes and Brunet, p. 139.

Figure 2


(A) Broadcaster Demand
Price of Show (P)
d'
d
d'
d
Number of Shows (q)
(B) Market for Program
P
D'
D
S
P_d
P_C
P_B
S
D
D'
Q_1
Q_2
Q
(C) Monopsonist
d'
MFC
d
MC
P_y
P_m
d
d'
Q_m
Q_y

during increasingly unpopular time periods and will not generate as much advertising revenue. If advertisers suddenly valued viewers more highly than was previously the case (e.g., if viewers became wealthier) broadcasters would find the value of each show to be increased and the entire demand curve would shift up to d'd'. The demand curve shows the maximum price that broadcasters would be willing to pay--not the price they would like to pay (he would like to pay nothing).

By adding the demand for all broadcasters together we get the market demand. There is also a supply of programs--i.e., the number of programs that producers will create at any given price. The higher the price, the greater the number of shows which are produced. We represent this with curve SS in panel B. In a competitive market P_C will be the price paid by broadcasters for shows. At a price below P_C (which the broadcasters prefer) the number of shows produced will be less than the quantity demanded. This is illustrated by price P_B because the quantity demanded (Q_2) is much larger than the quantity supplied (Q_1). The only way that broadcasters can induce the creation of more shows is by bidding up the price.

If cable increases advertising revenues demand will shift to D'D'. At the old price P_C, the quantity demanded is greater than the quantity supplied and the price will be bid up to P_d

Critics of this analysis contend that abstract models of competitive markets are not appropriate in this case. They claim that broadcasters may act in a non-competitive way so that an increase in demand does not lead to an increase in price. We shall examine the behavior of a non-competitive market below and shall then have a few words to say about its realism.

The most non-competitive market would be one where there was only one buyer of programs. He would not need to compete with any other broadcasters in purchasing programs so that there will be no external pressures forcing up the price of shows. This situation is known as monopsony. A monopsonistic broadcaster would wish to purchase programs until the cost of an additional program became greater than the increase in advertising revenues generated by this program. Unlike a competitive firm, when a monopsonist buys an additional show at a higher price (because the supply curve slopes upward) he must take account of the influence of the higher price on the other shows which he buys. Since the price of all shows will rise (assuming there is no price discrimination) the increased cost of buying an additional show is greater than the mere price of the additional show. This cost that the monopsonist faces is known as the marginal factor cost and is represented in panel (c) of Figure 2 by MFC. A monopsonist will buy a quantity Q_m and pay a price P_m. This is a lower price and a smaller quantity than will be bought by a competitive market.

More germane to our discussion, however, is the impact of higher advertising revenues on the prices paid for programs. When demand shifts to d'd' because of higher advertising revenues the monopsonist will pay a price of P_y and a quantity Q_y. This result is the same as that found in the competitive market: higher prices and greater quantities sold.

The only instance when the price would not increase is if the supply curve of shows were horizontal. In this case we would still find that the total revenue paid for the shows would increase since the quantity of shows would increase. From this theory we can conclude that broadcasters will pass some of the increased advertising revenues on to the producers of

shows when advertising revenues increase and we have not specified any particular degree of benevolence to these broadcasters.

This analysis has been simplified somewhat because we have assumed a single level of quality. Broadcasters will most likely wish to increase the quality (as perceived by viewers) of their programs in order to attract a larger audience. In a more rigorous fashion we can assert that both the quality and quantity of programs are inputs in the production of broadcasts. An increase in advertising rates (the price of the output) will increase the marginal revenue product of both of these factors and this will increase both the price of the factor and the quantity being hired.

Copyright and the Balance of Payments

If CATV reduces advertising revenues it also reduces payments to copyright holders. This holds for Canadian and non-Canadian copyright holders (and creators of shows) alike. In most instances forcing CATV to pay royalties to copyright holders will increase the amount of money flowing abroad in royalty payments. This will move the balance of payments in a negative direction.

In fact it seems safe to say that at least 50% of the added copyright payments will go out of the country. Canadian content rules limit the amounts of non-Canadian programming which can be shown over a given period of time.[19] Between the hours of 6:00 a.m. and midnight at least 60% of the programming must be of Canadian Content. In the period from 6:00 p.m. to midnight at least 50% of the programming must be of Canadian content for private stations but the 60% rule still holds for CBC stations. These appear to be binding constraints in that stations seem to use the smallest amount of Canadian programming possible. Foreign programs account for more than 50% of advertising revenues and if CATV copyright payments are based on the value of the programming these payments would go primarily to foreigners. In addition, CATV increases the number of American stations available to the Canadian audience and if copyright payments are made for these programs as well it would seem safe to say that only a small fraction of copyright payments would go to Canadian copyright holders.

The flow of copyright payments out of the country is not necessarily a bad thing. It is possible that these payments will increase the quality of the shows made abroad. If this were the case and if Canadians valued this increase in quality more greatly than the additional copyright cost, then the welfare of

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[19] See 1977 Television Broadcasting Regulations, page 7. published by CRTC

Canadians would be improved despite the flow of money leaving the country.

There is a tendency to feel that Canada can get something for nothing by restricting copyright payments abroad. That this is not always true was explained in the last paragraph but it is probably close to the truth with present day realities. The Canadian market is only ten percent of the U.S. market and increased copyright payments by Canadians for American programs probably have little influence over the quality of these shows. If Canada could reduce its copyright payments to zero (say by eliminating all Canadian broadcasters) it could free ride entirely on the American coattails. Canadians could still watch television thanks to CATV. Such a system is probably unacceptable to many Canadians, however.

Part II

The Impact of CATV on TV Revenues

As we have seen, the institutional arrangements whereby television derives its revenues through advertising lead to some grave market distortions.

It is not the purpose of this study to analyze this particular source of distortion in detail. We are concerned with the specific impact of various proposals dealing with CATV payments for rediffusion. Our purpose is to determine (1) the impact of CATV on the revenues of broadcasters and artists (2) the impact of various payment schemes on these two groups as well as society at large. The simplifying assumption throughout this analysis is that the market is working well prior to the introduction of CATV rediffusion.

The copyright payments for TV programs are handled in a manner whereby the creator of the program sells some rights regarding the program to a middleman (in this case usually a TV network) who then broadcasts the show to the ultimate consumers of the show who do not directly pay for the show. Advertisers pay for the show. Thus under the present system the ultimate users of the show (the audience) never reveal their preferences for the show in a marketplace.

Under these circumstances it seems rather strained for Keyes and Brunet to question a passage from the Economic Council's report regarding copyright

payment for CATV. From Keyes and Brunet:

> The Council felt that the presence of advertising was the prime determinant of whether payment should be made to the copyright owner, but it is difficult to reconcile this position with the Council's previous guidelines that "compensation should be in proportion to use and each user should pay his fair share". To say that payment should be governed by use on the one hand and by advertising on the other appears contradictory.
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> P. 139 K and B

Keyes and Brunet do not mention that advertising is the method of payment even without the existence of CATV. If they wish to argue for a system of pay TV then they might be on firm footing but once one accepts advertising as an appropriate method of payment for TV there is no inconsistency in trying to use advertising as the prime method for CATV as well. This is especially true when CATV viewers influence the over the air broadcasters and change their revenues.

If CATV viewers add nothing to the revenues of over the air broadcasters then a good case could be made that the people watching CATV should pay a copyright fee on the program they watch in a manner analogous to pay TV.[1] If this were to happen we would find ourselves with two very different systems of television viewing existing side by side. The condition most likely leading to this situation would be where advertising messages were blocked out on CATV so that people watching CATV would have no value to broadcasters at all.

The use of CATV introduces a second middleman into the transmission mechanism between producers and the audience. If CATV does not alter the relationship between market size and advertising revenues, program producers

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[1] Whether this payment is made directly by CATV customers or indirectly through higher user fees for CATV is essentially irrelevant to the discussion.

should not be adversely affected. In fact, since CATV tends to increase total audience size we would expect that advertising revenue would go up in this instance and producers would receive more money for their copyrights.

It is reasonable to expect that CATV will influence the transmission mechanism between audience size and advertising revenues. This result seems likely for several reasons. Firstly, CATV tends to fragment television audiences. This means that the geographical homogeneity of an audience is greatly reduced with the introduction of CATV. In an area served by CATV, many viewers will watch programs originating from outside the normal television viewing area so that in a given area viewers watch a greater diversity of stations and the audiences for stations carried on the CATV are dispersed over a much larger area.

This fragmentation may change the audience size-revenue relationship in several ways. Firstly, the average distance from the television transmitter to the audience increases when CATV is introduced because people watch stations that they couldn't receive over the air. This will change the value of a given size audience if advertisers care about the distance of the viewer from the program origin. If the advertising is local in nature we would expect distant viewers to be less valuable to advertisers than local viewers. The net effect would be for CATV to reduce the advertising revenue generated by any given size audience.

A second way CATV may influence the audience size-revenue relation has to do with the empirical assertion that CATV tends to strengthen large stations and weaken small stations.[2] This is due to the fact that the signals of large audience TV stations are usually put on CATV and the higher quality programming tends to pull away viewers from smaller stations with lower quality programming. It has been suggested in the literature that advertisers might

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[2] This assertion has been made by Rolla Park among others.

not value additional viewers as highly when the advertisement is already reaching a large audience. This hypothesis has been tested and confirmed by Park. The rationale for this type of behavior seems extremely weak.

Why should advertisers value marginal viewers at a diminishing rate? It seems reasonable to assume that any additional viewer will have the same likelihood of being influenced by the advertisement and should therefore be equally regarded by the advertiser with prior viewers. If, on the other hand, advertisements are more effective when a smaller percentage of the population is aware of them, say because the information can easily be spread by word of mouth, the results obtained by Park would make more sense. This particular form of advertising effectiveness seems rather contrived and not a form of reasoning in which to place much faith. It is also interesting to note that under this scheme, CATV should have the impact of increasing advertising revenues because it tends to fragment the audience so as to increase the effectiveness of any word of mouth advertising.

There are other potential explanations of the diminishing marginal viewer revenue (DMVR) effect which are less difficult to believe. Television stations with large audiences are usually found in large metropolitan areas where there are also more competing stations than in less populated localities. The paucity of competition in these small localities may lead to the exercise of monopoly power by the local television stations. This would result in above normal advertising rates and revenues in low population centers.

A second explanation of the DMVR effect has to do with locational factors. Large markets are likely to have a large percentage of the population living far away from the location of the broadcast and/or the location of particular

advertisers. If the percentage of people living far away is higher in high population areas then the DMVR effect may in fact merely be the local-distant distinction in disguise.

CATV may influence advertising revenues by directly changing the size of the audience. Larger audiences will lead to greater advertising revenues, Ceteris Paribus. We might expect larger audiences for two reasons. Firstly, CATV improves the reception of television signals by eliminating many forms of interference due to antenna directionality, etc. Secondly, CATV increases the choice of programs available to most viewers. Both effects work in such a way as to make telvision viewing a more attractive activity than would be the case without CATV.

One of the purposes of this study will be to test these various propositions regarding the changes in advertising revenues brought about by CATV.

The Data

In order to estimate the important relationships it was necessary to construct a data set which would give us information on the audience size of television stations, income of viewers, the number of viewers outside of non-CATV viewing area, possibilities of collusion among television broadcasters in a given area and advertising rates for various broadcasters. The purpose of each variable will be described in the following section. The construction of proxies for these variables and a discussion of their strengths and weaknesses follows.

(a) Audience Size: This information was taken from the Reach book published by the Bureau of Broadcast Measurement (BBM). This book gives the number of people reached and the number of hours watched in a week for each television station. It also gives these same variables for each BBM area (similar to Census Districts). The audience values for the station are broken down into each BBM area in which it has a non-negligible audience. For each BBM area the audience is broken down into the stations which people in that area watch.

There are two audience figures available in these data. One is known as the audience reach, the other is total viewing man-hours per week. Audience reach is a measure of the number of individuals who tune to a given station for the majority of any fifteen minute period during the week. This measure is insensitive to the variations in viewing intensity, beyond the first fifteen minute period. Someone who watches a station for thirty hours a week is given equal weight to someone who watches for a mere fifteen minutes. For this reason it is to be expected that reach is not very indicative of the true audience size of a station.

The second measure of audience is total viewing man-hours. This variable is constructed by adding up the number of hours each viewer watches of a given station. This measure is also imperfect since the show which is seen the longest in a fifteen minute period has all fifteen minutes assigned to it. This variable appears to be considerably more accurate than reach since people who watch stations for longer than fifteen minute intervals will have their total hours weighted in favor of those shows which they in fact watch the most.

Both of these variables are constructed by the BBM which sends blank diaries to individuals who then fill them out. The diaries break the viewing week into fifteen minute periods and viewers put down the program which was watched the most during that period. When a diary is sent to a child the parents are supposed to fill it in for the child. The results of the survey are tabulated by BBM and each category of individual (adult, man, women, etc.) has its observations weighted by its percentage of the population in a given area to arrive at the final figures which are estimates for the entire population.

It is not clear that our variable need be overly accurate. Since we wish to explain advertising rates we merely need to determine which variables advertisers look for when they decide to purchase advertising time. If they are content with audience reach or total hours as a measure of audience size then further refinement of these variables on our part may prove counter productive.

(b) Income of Viewers: This information comes from Taxation Statistics for 1975. This publication gives income figures for census districts. These census districts were matched up with BBM areas and the average per capita income calculated over all viewers of a station, was determined. This required weighting the income figures for every census district in which

there resided viewers of a particular station by the total hours variable for that station in the particular locality.

This weighting scheme is somewhat imperfect to the extent that total hours is an imperfect variable. Also, these income figures are not deflated by geographic price indices which may lead to some further distortions of the results.

(c) Distance of Viewers from Broadcast: This variable was taken from the BBM figures for stations. Since total viewing hours were broken down by area, it was possible to assign the viewers of each area to the categories of local or distant. In fact the areas were assigned as A contour, B contour and C contour. A contour is defined as that area around the broadcast station which has satisfactory reception 90% of the time for 70% of televisions. B contour is defined as the area where reception occurs 90% of the time for 50% of televisions. C contour is defined as anything worse than B contour. The contours for each station come from Television Factbook-Stations.

In cases where a BBM area was in more than one contour an attempt was made to look at the major population centers within each area and determine which contour seemed most appropriate.

In some instances problems were encountered because the areas used by BBM overlapped and certain populations were included in both (e.g., core cities and the district containing them were often given as separate BBM areas). In these instances attempts were made to disentangle those various populations.

In our empirical work the A and B contours were added together. This allowed us to distinguish those viewers who probably require CATV for reception of a station (C contour) from those viewers who don't (A and B contour).

(d) Herfindahl Index: The Herfindahl index is defined as the sum of squared market shares, where market share for a firm is the percentage of the market output which that firm supplies. In the present instance the Herfindahl index for each BBM area was calculated by taking the percentage of the total viewing hours for the market (BBM area) generated by an individual station, squaring this value and then summing over all stations seen in that BBM area. This was done for all stations as well as for only Canadian stations. The Herfindahl index is a measure of market concentration. If there are many broadcasters in a market the share of each one will most likely be low and the Herfindahl index will be low. This will not be true if one firm dominates the others. A high index is usually taken to mean monopoly power exists in the market and collusion is possible. In our work the Herfindahl index will be shown to be negatively related to Cable penetration in an area.

With the Herfindahl index calculated for each market we were able to construct a summary measure of market collusion for each television station. This was done by constructing a weighted average of the Herfindahl indices based upon all the areas into which a television station's signals (whether over air or CATV) reach. The weights are the total viewing hours for that station in each BBM area. We thus have an 'average' Herfindahl index for each television station. This value is not based on any specific market but is indicative of whether the station operates in markets which are concentrated.

(e) Advertising Rates: This information comes in two forms and from several sources. Advertising rates can be either national or retail with the retail rates being somewhat less than national rates. Retail rates are given only to local advertisers and are sold by individual stations. National rates

are sold to any advertiser by either the individual station or the network it is affiliated with. Retail rates don't guarantee that the commercial message will actually be shown. If the station manages to sell an additional commercial at a national rate the local (retail) commercial may be bumped.

In addition, advertising rates vary depending on what time of day or day of week the particular message will be shown. Prime time (weekday nights) usually commands the most expensive advertising rates. The CRTC allows a maximum of 12 minutes of advertising per hour.

Television stations display their rates on circulated 'rate cards'. National rates are listed in publications such as Canadian Advertising Rates and Data. Local rates must be taken directly off station rate cards. These rate cards were obtained by solicitation through the mail.

Comparing rates was not always easy because various stations use different time classifications. One station might have its highest rates from 7-10 p.m. while another might have them from 8:30-10:00 p.m. This made comparison of rates somewhat difficult. It was decided to take the average rate for the hours of 7-11 p.m. weighted by the frequency of each rate in that time period.

One difficulty with the rate data is that not all time slots are sold. It is not clear what it means if station A has higher rates than station B if station A does not sell as many of its slots as station B.

Also, various quantity discounts are given by stations to qualified advertisers. These discounts vary from station to station and are difficult to incorporate in the data.

It is possible to make an estimate of the extent to which these practices reduce advertising rates from the list prices. We have taken three stations and calculated their potential advertising revenues if all

their time slots in a week were sold at the list 30 second advertising rate. Two of the stations were large (CBLT in Toronto and CFTM in Montreal) and the third station was small (CBCT in Charlottetown). We then divided this largest potential revenue by the number of viewing man-hours per week for the station. This gave us the value of a viewing man-hour. The results were 3.5 cents, 4.7 cents and 4.5 cents for CBLT, CBCT and CFTM respectively. We then divided the total television advertising for 1978 (approximately $400 million) by the total Canadian viewing man-hours per year and got a result of .87 cents per hour. It is quite obvious that revenues are much lower than their maximum potential. Other factors reducing the calculated station revenues are the selling of local advertising time and the fact that 30 second slots are often more expensive than 60 second slots.

We will continue to assume that the list rates are indicative of the supply-demand conditions for the individual stations. Advertising rates give us somewhat more flexibility than revenues and are more easily available. Our regression results will indicate that this assumption is reasonable.

(f) Population: This variable comes from the 1976 Census, Population: Geographic Distributions. The variable was calculated in a manner similar to the Herfindahl indices and income figures. The population for each market which had viewers of a particular station was found and these values were weight-averaged for all markets receiving the stations signal where the weights were the total viewing hours in the market.

This variable is supposed to measure the number of people in each market. To the extent that census areas are not markets this variable will fail in its purpose.

(g) CBC Dummy Variable: Many of the stations in our sample are owned by the Canadian Broadcasting Corporation. To determine the possible impact of this ownership we have included a dummy variable which takes on the value of one if the station is affiliated with the CBC and a value of zero otherwise.

(h) French Dummy Variable: Most of the stations in Quebec and several in other provinces have French programming. To determine if advertisers view these audiences differently than English speaking audiences (or conversely that these stations behave differently we have included a dummy variable which takes on the value of one if programming is in French and zero otherwise.)

Determination of Advertising Rates

The major empirical goal of our study is to determine the impact of CATV on the advertising revenues of over the air broadcasters. This can be broken up into two major effects: (1) the negative impact due to market fragmentation; (2) the positive impact due to the influence of CATV on the viewing habits of the population. The latter effect will be investigated in the next section and we shall now turn our attention to the former.

Much of the discussion regarding various copyright proposals has depended crucially on the impact of market fragmentation. Market fragmentation is brought about by CATV because viewers in any one locality will have a wider choice of alternative programs on CATV and some viewers will elect to watch programs which originate from distant areas which would not be accessible without CATV. Each broadcaster whose programs are carried on CATV finds his audience spread out over all geographical areas which are served by CATV's which carry his station. The average distance between broadcaster and viewer is increased by CATV.

This has a potentially deleterious effect on advertising revenues, to the extent that advertisers value viewers less in localities other than that immediately surrounding the broadcaster. We would expect local advertisers to place less worth on viewers in distant localities since it is unlikely that these viewers will patronize an establishment which is far away. The further away these viewers the less valuable we would expect them to be to a local advertiser.

We would not expect national advertisers to be affected as strongly. Viewers far away from transmissions are as likely to be valuable as viewers

close to transmissions. To the extent that fragmentation helps or hinders the transactions involved in coordinating advertising purchases we might expect advertising revenues to increase or decrease respectively.

In order to test these hypotheses we have constructed a data set in which the audience for each station is broken down into various categories based on location from the transmitter. For each station we have determined the number of man-viewing hours per week in the A plus B contour and the C-contour.

There are several problems in the construction of these data. Several stations (especially in the Maritimes) have over the air retransmission of their signals at other localities. We have always included just the contours of the major signal in constructing our data set. In addition, the audience was partitioned according to BBM regional classifications. These regions were often entire census divisions which were sometimes as large as the B contour of the stations. The B contour often cut several of the regions and partitioning the viewers required some guesswork. For these reasons our contours do not inspire as much confidence as we might have hoped.

With the audience partitioned in this manner it is possible for us to determine the value of both of these groups to advertisers. We wish to explain advertising rates (both national and local) as a function of the audience size in each of the categories. These categories should measure the likelihood of using CATV as well as distance from the transmitter (relative to its strength and height). This is because viewers in the C-contour are not likely to receive a signal of sufficient strength over the air to provide reasonable reception. The only way they are able to view the station is over CATV.

In addition to audience size, we shall expect audience income to influence advertising rates. This is for one of two possible reasons. If most viewers are wealthy they probably spend more money on products and are more valuable to advertisers. In addition, some areas have higher costs of living than others. To the extent that income differences are illusionary (due to cost of living differences) we would expect different costs of living to be reflected in different advertising rates.

We have also included several other variables in the data set. The Herfindahl index measures the ease of collusion in a market. A market dominated by a small number of firms will register a high value (close to one) for the Herfindahl index whereas markets with many small firms will have a low value for the Herfindahl index (mean zero).

Dummy variables for those stations which either broadcast in French or are owned by the CBC have also been calculated. Dummy variables have values of one if the criterion is satisfied and values of zero if it is not. The coefficients on these variables measure the difference in advertising rates between those stations which fulfil the criterion and those which don't when the impact of the other variables has also been taken account of.

The average population of the B.B.M. areas which a station broadcasts into have also been calculated. If advertisers value viewers in heavily populated areas differently than they value viewers in sparsely populated areas this variable will pick up the difference.

Another consideration prompted by previous studies concerned the linearity of the relationship between audience size and advertising rates. Fisher found the relationship to be linear whereas Park found it to be non-linear. The result is of possible significance because Cable is thought to increase the audience of large stations relative to that of

small stations. If revenues increase at a decreasing rate when audience size increases (the result found by Park) a shift to large stations would decrease the total advertising revenues of over the air broadcasters.

In order to examine the linearity of our relationship we sometimes ran a quadratic form of the audience variable and we sometimes ran it in logged form. Further examination of this point will appear in our discussion of the empirical estimates.

We ran a regression of the form

$$R = \beta_o + \beta_1 A + \beta_2 C + \beta_3 I + \beta_4 H + \beta_5 P + \beta_6 CBC + \beta_7 F + \mu$$

where R is advertising rates during prime time, β_o is a constant terms, A and C refer to man-hours of viewing per week in contours AB and C respectively, I refers to average viewer income, H refers to Herfindahl index, P stands for population, CBC and F are dummy variables for CBC affiliation and French programming respectively and μ is an error term. The value of the coefficients β_1 and β_2 indicate the average worth to an advertiser (or station) of a viewer in either of our two categories.

These regressions were run with both national and local advertising rates. Past studies on U.S. data (see Park [1]) have not distinguished between these advertising rates in this manner. Previous studies, on U.S. data, also have not had as much market fragmentation to measure for two reasons: (1) There is a much larger percentage of homes on CATV in Canada than in the U.S. because U.S. regulations have been very restrictive about letting CATV in to the 100 largest markets; (2) our study uses more recent data and CATV penetration increased rapidly since the late 1960s, the period upon which Park's data was based.

There are several predictions we can make regarding these coefficients:

(1) β_1 will be larger than β_2; both will be positive

(2) β_3 will be positive

(3) β_4 will be positive

(4) β_5, β_6 and β_7 can be of any sign.

Also, we would expect the difference between β_1 and β_2 to be more pronounced for local advertising rates than for national advertising rates since local advertisers should value distant viewers to a lesser degree than national advertisers.

Regression Results

Various combinations of our independent variables were used in regressions which attempted to explain advertising rates. The results can be found in Table 1. Some general comments can be made before we discuss the particulars.

(1) The audience size is always positive and significant.[3]

(2) Income is always positive and generally significant.

(3) The Herfindahl index is always negative and usually quite significant.

(4) The CBC dummy variable is always negative and quite significant.

(5) Our French dummy variable and population variables are not significantly different from zero.

(6) Our specifications seem capable of explaining about 90% of the variance of the dependent variable, a result in line with those of past studies and one which should give us confidence in our work.

The first matter we wish to investigate concerns the relative value of local and distant viewers. Looking at row one we can see that the value of the A coefficient (.035) is two-and-a-half times that of the C coefficient (.014). Using regressions 1 and 4 we are able to determine the significance of this difference. The calculations are shown in Table 2. We can see here that the difference is significant at the 95% level but not at the 99% level. Also included in the table

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[3]Statistical significance means that as statisticians, we can be confident that our coefficient has at least a 95% probability of representing the actual sign of the underlying variable.

Table 1

Regressions with Advertising Rate as Dependent Variable

	A	C	AC	log A	log C	log AC	AC^2	INC	CBC	HERF	POP	FR	R^2
(1)	.035*	.014**						.026**	-52*	-253*	-.86 E-5	-32	.900
	(93.5)	(4.3)						(5.4)	(8.0)	(9.9)	(.3)	(2.2)	.887
(2)	.013**	.036*						.022	-42	-183	.3 E-4	52	.865
	(4.1)	(10.6)						(.9)	(1.7)	(1.2)	(1.5)	(1.5)	.825
(3)	.025*	.029*						.013	-58**	-245	.4 E-5	-2	.925
	(23.6)	(10.8)						(.4)	(4.8)	(3.2)	(.1)	(0)	.903
(4)			.028*					.024**	-55*	-264*	.5 E-5	-26	.891
			(216)					(4.3)	(8.3)	(10.3)	(.1)	(1.3)	.880
(5)			.035*				-.3 E-6	.026**	-56.6*	-214*	.2 E-4	-20.1	.902
			(109)				(6.0)	(5.4)	(9.5)	(6.9)	(1.2)	(.9)	.889
(6)	.040*	.021*					-.3 E-6	.028**	-54*	-209*	.5 E-5	-27	.908
	(91)	(8.7)					(5.1)	(6.5)	(9.1)	(6.9)	(.1)	(1.6)	.895
(7)	..010	.032*					.13 E-6	.014	-35	-212	.2 E-4	43	.865
	(1.9)	(6.7)					(.5)	(.4)	(1.4)	(1.6)	(.4)	(1.1)	.823
(8)						116*		.029	-83*	-138	.8 E-4*	23	.784
						(80.1)		(3.1)	(9.7)	(1.4)	(16.2)	(.6)	.762
(9)				118*	1.52			.031	-82.9*	-138	.7 E-4*	19.9	.774
				(51.2)	(ø)			(3.3)	(9.0)	(1.3)	(12.3)	(.4)	.746

* significant at 99% level
** significant at 95% level
F statistics in Parenthesis
bottom R^2 is the corrected R^2.
Advertising rates and viewing man-hours are for September, 1978.
Advertising rates are national except for rows 2 and 7.
67 national rates, 32 local rates.

Table 2

Testing for Difference of Coefficients on A and C

In equation 1

R^2 of equation 1 = .89978

R^2 of equation 4 = .89120

$F = (.89978 - .89120)/(1 - .89978) \times 57 = 4.87$

In equation 6

R^2 of equation 6 = .908

R^2 of equation 5 = .902

$F = (.908 - .902)/(1 - .908) \times 57 = 3.72$

95% significance implies an F of 4.0

99% significance implies an F of 7.1

are calculations for equation 6 which has a slightly different specification of these variables. In this instance the difference in coefficients is not significant at the 95% level although it is 'close'. As we will see below, it can be argued that equation 6 is a superior specification of the relationship than equation 1.

If we were to end our examination at this point we would conclude that local viewers are worth more than distant viewers but that the relationship was rather weak. However, further examination will lead us to question the robustness of these results even more. In particular, we wish to see how viewers are regarded by local advertisers.

Equations 2 and 7 will help us in this endeavour. The variables are identical to those of equations 1 and 6 but our source consists only of those stations for which we have local data. We expected the difference between these coefficients to be greater in equations 2 and 7 but to our surprise and consternation we find this not to be the case at all. Instead we find that distant viewers are worth more than local viewers. (The difference in coefficients is not even close to being statistically significant, however.) This is surely a suspicious result. To determine the extent to which it was determined by sample selection (since there are fewer stations which have local data, 32 vs. 67 for nation rates) we regressed the same variables on national rates for those stations which had local rates and regression 3 of Table 1 gives these results.

In this case we find that the distant audience is still worth more although to a lesser degree than in the previous instance. Thus sample selection plays a large part in causing these results. In addition, all CBC-owned stations have local rates and they have a larger impact on the results

of this sample. As we shall see later there is reason to believe that CBC stations fail to price their advertising rates in a competitive manner, thus distorting natural market effects. When we tried running these regressions for the non-CBC sample, however, there was no appreciable difference, indicating that the CBC stations were not responsible for the greater value of distant viewers.

The overall results from our regressions are ambiguous. It seems fair to say that local audiences are probably worth somewhat more than distant audiences but that the available evidence for this assertion is quite weak.

In the U.S. study by Park similar results were obtained. He found local audiences to be worth 50% more than distant audiences but only borderline statistical significance was found. For the subsample of independent stations no significant result was found and he didn't report these results.

One other factor influencing the relative value of local and distant audiences is a CRTC regulation requiring Cable companies if asked, to delete distant broadcasts and replace them with local signals when the two broadcasts have at least 95% of the program material in common. The impact of this regulation is to replace distant signals with local signals when two stations on CATV are carrying the same television program. Many viewers who report their television habits to data collecting organizations are likely to indicate that they were watching the distant signal when in fact they were receiving the local broadcast including the commercials. This is because viewers tend to identify stations by

their position on the television turning knob. This will bias the reported data such that the local audience will appear to be more responsive to advertisements and therefore give a larger coefficient on advertising rates since local audiences are in fact larger than the reported data.

The conclusion that local viewers are worth more than distant viewers, though theoretically appealing, is quite tenuous. Even if we accept these results we would need to quantify the impact of Cable on local/distant relationships before we could determine the reduction in rates caused by CATV.

Our next concern involves the linearity of the advertising-audience relationship. If the relationship were curved so that increasing audience size increased advertising revenues at a decreasing rate, we would find that a shift in audience from small audience stations to large audience stations would decrease the total revenue of all broadcasters grouped together. This was exactly the effect reported by Park. He ran his regression in a quadratic form (i.e., he included audience and audience squared as independent explanatory variables) and found the quadratic term to be significantly negative.

Regressions 5 and 6 in Table 1 are an attempt to investigate this result with our data. Our quadratic term is negative and significant in both regressions indicating that a non-linearity as described above does in fact exist.

There are some theoretical problems with a quadratic specification of the audience-revenue relationship. A negative quadratic term implies that at some point advertising rates will fall when audience size increases and this seems to be an unlikely result. We calculated the point at which this would occur based on our coefficients and found that our audience size was nowhere in the range of this downturn of the relationship.

In an attempt to circumvent the theoretical difficulties of a quadratic form we attempted to fit the data to several other non-linear relationships. Regressions 8 and 9 were run with the audience measured in natural logs. As can easily be seen, the fit of the regression (as shown by R-squared) is much lower for this specification. Similar results were obtained in estimating a hyperbolic function (not shown). These specifications are superior in that, unlike the quadratic, they do not turn down at some audience size.

We ran several other tests on the linearity of this relationship. An inspection of the residuals (predicted value of the dependent variable minus the measured value) ranked by advertising rates did not show any clearcut curvature. A test of curvature was performed whereby the stations were ranked by advertising rates and broken up into 7 (and 4) groups. The increased explanatory power of the regression when the slope of the coefficient of audience size was allowed to vary between groups was measured and found to be insignificant.

We conclude that the evidence favouring a curved relationship is weak. There is no denying the fact that a quadratic form gives a better fit but this may be due to a few outlying observations. General tests of curvature give negative results.

A curved relationship is also difficult to explain on an economic level. If advertisers are merely interested in reaching a given population one would think that any random member of that population would be worth the same as any other (other personal characteristics are unknown). If advertising is transmitted by word of mouth (after television viewing) it is possible to construct an explanation whereby the first viewers are worth more than the last. This seems rather farfetched, however.

The explanation may be in the cost of advertising. It may well be that the average cost per viewer reached is lower for large stations than for stations with small audiences. If large stations tend to compete only with each other[4] we would find that they would have lower advertising rates per viewer.

The impact of the Herfindahl index is the next important matter to be taken up. We included this variable to pick up any monopoly power that might exist on the part of broadcasters in some localities. Any such power would be reflected in a positive coefficient for this variable. The significant negative sign is very surprising and difficult to explain. This result is quite robust and holds up under almost all specifications.[5] This is true for Herfindahl indices based on all television broadcasters received in an area as well as an index based on only Canadian stations.

There is obviously some effect other than market power which is being picked up. Our examination of the influence of CATV on viewing habits will reveal just what this effect is. It will be a result central to the conclusions of this study.

The final result of interest in these regressions concerns the coefficients on the CBC dummy variables. The consistently significant negative sign on this variable indicates that when the impact of the other variables is taken

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[4] If all stations competed against each other, regardless of size, then the price per viewer would be the same for all and large stations with lower costs would merely earn higher profits.

[5] Except in equations 7, 8 and 9. In 7 the lack of significance is probably due to multicollinearity. The following results, based on local advertising rates, will demonstrate this fact

$$LRT = .018A + .035C - 272Herf + K \qquad R^2 = .842$$
$$(19.8) \quad (12.2) \quad (5.09) \qquad R^2 = .827$$

In equation 8 and 9 the misspecification of the audience variable is most likely responsible.

account of, CBC stations consistently charge advertising rates below the level that would be charged by non-CBC stations with the same audience size and characteristics. This can be interpreted to mean that CBC stations are not charging profit maximizing advertising rates since the private stations are certainly trying to maximize advertising revenues.

This result is not without precedence in the literature. In 1963 O. J. Firestone wrote:

> ...the CBC could about double its commercial revenues without significantly increasing the time devoted to commercial messages provided the Corporation wished to pursue appropriate policies concerning the pricing and the marketing of commercial time it has at its disposal.
>
> The data show...that the CBC's cost per thousand in prime-time was on the whole about one-third below those charged by private broadcasters in comparable time periods.[6]

His estimation techniques were considerably less precise than our own but our conclusions are similar to his. We find that CBC stations tend to charge about $55 less than the competitive advertising rate for a 30 second spot. With an average advertising (national) rate of $228 this works out to a reduction of 25%.

It should be remembered that not all advertising rates are sold and that total revenue depends on the percentage of spots sold as well as the going price. We cannot directly measure the percentage of spots sold for each broadcaster but we can gain some institutional insights. The CRTC allows broadcasters up to 12 minutes per hour for advertisements. The CBC only allows its stations 10 minutes of advertising per hour. Thus we might expect that CBC stations would sell a higher percentage of their ads and also that their rates would be higher since they supply fewer commercial messages. Fewer commercial messages make the programming more

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[6] See Firestone, p. 294.

attractive and reduce the opportunities for advertisers to reach the audience of this station. The smaller supply of advertising time the higher the rates should be since many stations will not be in perfectly competitive markets and will in fact have downward sloping demand for their advertisements.

This result is really not surprising. The CBC is not a profit-maximizing corporation and it would be unusual for it to maximize profits since it exists in a different environment than private stations. The managers of private businesses are usually motivated by different objectives than those of public enterprises.

This brings us to the foremost question of this section--to what extent does Cable, by fragmenting the audience, reduce advertising revenues? We can estimate the <u>largest</u> possible loss by making several assumptions. First, we assume that all viewers in the C contour are on Cable and would not be receiving the station without Cable (we exclude the possibility of over-the-air retransmission or consumer purchases of large antennas). Next we assume that local viewers are worth twice as much as distant viewers. This is the most extreme assumption we can make given our regression results.

Twenty-six percent of the viewing audience (measured in viewing hours) is located in the C contour. Since these viewers are worth only half of what they would be worth if they were local viewers the total impact would be to reduce advertising revenues by 13%. This is probably an <u>overstatement</u> of the true impact of fragmentation since our assumptions were rather severe.

THE EFFECT OF CATV ON VIEWING HABITS

CATV television increases the choice of programming available to viewers. Since CATV allows a viewer to watch all stations which he is likely to receive without CATV we can predict that CATV will unambiguously increase the viewer's pleasure derived from watching television. This increase in pleasure is likely to lead to an increase in the amount of time spent watching television under most circumstances.

There are certain conditions under which an increase in viewer pleasure will not lead to an increase in television viewing. One constraint placed on television viewing is that of time. There are a maximum number of hours that one can watch television during any given period of time. If viewers already are watching television for the maximum number of hours possible, an increase in programming attractiveness could not lead to an increase in viewing by the viewer although it may lead to an increase in the intensity with which a viewer concentrates on a show.

It is also possible that television viewing is an inferior good with respect to pleasure (income). Inferior goods possess the attributes of reduced consumption being related to increases in wealth (income). If a taste for television viewing can be sated or if television viewing pleasure is complementary with other activities, we might find that superior programming leads to less viewing by the public![7]

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[7] By complementarity we mean that other activities become more attractive when television becomes more attractive, e.g., if television becomes exhilarating to watch it might cause individuals to partake of other activities to calm themselves. The increased sexual content of recent shows comes quickly to mind.

We attempted to measure the impact of CATV on viewing habits. One primary test consisted of comparing the change in viewing habits with the change in CATV usage in localities for which it was possible to get appropriate data. Two data sources were used. The first was created by looking up all CATV systems operating in Canada in 1969 and 1978, apportioning the subscribers of these systems into the appropriate B.B.M. region and using B.B.M. data to calculate viewing habits for each of these regions. The results are found in Table 3, row 1. The dependent variable is the change in viewing hours per week. The coefficient of change in CATV penetration is insignificant and of the wrong sign. A dummy variable for each province was included to take account of geographic differences.

Row 2 of Table 3 shows the results for a different sample of data. These data consist of a sample of major metropolitan areas which have CATV penetration rates compiled by the B.B.M. It was thought that their data collection methods might be superior to ours. Once again, however, we find that the coefficient of CATV change is not significant and is of the wrong sign.

In row 3 we ran a regression which is no longer in the form of first differences. In this case we are regressing the level of CATV penetration in 1975 on the average viewing hours for 1975. Our sample consists of the 24 major metropolitan areas as in row 2. As in our other regressions, CATV penetration does not significantly affect the dependent variable. In fact, according to our results, an increase in CATV use from 0 to 100% of the population would increase T.V. viewing by only 8 1/2 minutes.

From these results we are forced to conclude that CATV does not significantly affect the number of hours that people spend watching television.

This result, although puzzling at first blush, is consistent with other results of investigations of this kind.[8]

Additional verification of our results come from a special B.B.M. analysis. Viewing habits of those with CATV were contrasted with those of cableless people. For men it was found that CATV viewers watched an average of 21 hours and 41 minutes of television per week and those men without CATV watched for 21 hours and 1 minute. For women it was a different story. With CATV they watched for a total of 24 hours and 27 minutes. Without CATV they watched for 25 hours and 25 minutes--almost an hour more. We thus conclude that CATV does not increase the amount of time people spend watching television.

It is important to emphasize that we cannot conclude from these results that CATV does not increase the value of an audience to an advertiser by changing viewing habits. What we have found is that CATV doesn't increase the amount of time that people spend watching television. Time spent in watching television can also be spent in other activities such as talking or reading. If CATV increases the intensity of television viewing, advertisers will find that television will be a more effective medium per viewer reached than it was prior to CATV. This should lead to an increase in advertising rates even though the total volume of viewing hours remains the same. This proposition, however, is somewhat more difficult to test.

We now come back to the results of the previous sections. In particular we are ready to explain the negative signs on the Herfindahl indices in our regressions on advertising rates. At that time we mentioned that market

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[8] See Park [1], pp. 21-23. CATV viewers in the U.S. watch more television than non-CATV viewers but there is a self selection process at work so that people who watch more television are those most likely to value and subscribe to CATV.

Table 3

Regression of Change in Viewing Hours on
CATV Penetration Change

	Constant	CABLECH	Ontario	Quebec	Alberta	R^2	N
(1)	-.012	-.029	2.8	1.6	1.2	.27	44
		(.8)	(8.9)	(2.7)	(1.0)	.19	4
(2)	3.73	-4.9				.16	24
		(3.9)				.12	

Regression of Viewing Hours on CATV Penetration

		CATV					
(3)	23.9	.0014				0	24
		(.003)				-.04	

Change in viewing hours taken from 1969 and 1978 Reach book by B.B.M.
Cable penetration change in row 1 comes from Television Factbook-Services, for 1969 and 1978.
Cable information in regressions 2 and 3 come from B.B.M. Household enumeration, 1971 and 1975.

power would be reflected in higher advertising rates and that the negative sign was contrary to that hypothesis. The reason that our Herfindahl index was so strongly negative is because it was picking up the influence of another variable--the CATV penetration rate!

To understand this one merely needs to realize that CATV reduces the market share of each local station and that the Herfindahl index will be reduced accordingly.[9] Since CATV viewers value the additional programming (they demonstrate this fact by their willingness to pay for the service) we would expect higher advertising revenues. We have demonstrated that CATV does not increase the amount of time that people keep the television turned on. Thus the higher rates due to CATV will not be picked up by the audience variable. Instead it will be picked up by the Herfindahl index which is in essence a proxy for CATV penetration.

To demonstrate this last point we ran a regression with the Herfindahl (Herf) index as the dependent variable. Our explanatory variables were CATV penetration (CAB) population (POP) and the number of local stations (STA). Our sample consisted of 18 localities with published CATV penetration rates. Our results are given in the following equation.

$$\begin{array}{lcccc} \text{Herf} = & -.004\ \text{CAB} - .00005\ \text{POP} + .01\ \text{STA} & R^2 = .496 \\ & (12.97) \quad (1.2) \quad (.2) & N = 18 \end{array}$$

F Statistics are in parenthesis.

The only variable which is statistically significant is the CATV penetration rate. The coefficient tells us that for every 10 point increase in penetration rate a locality has a decrease in its Herfindahl index of .04.

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[9]Unless CATV brings in a station which becomes so popular that it dominates the market to a greater extent than any of the local stations did before the introduction of CATV.

This result, in conjunction with some results found in previous sections allows us to make some estimates of the beneficial impact of CATV on advertising rates. The coefficient of the Herfindahl index in our regressions on advertising rates were clustered around -225. The CATV penetration rate in Canada is now at 50%. From the above regression we would expect that a CATV level of 50% would decrease the Herfindahl indices by .20. A decrease in the Herfindahl index of this magnitude should lead to an increase in advertising rates of $45 per 30 second commercial. With a mean advertising rate of $230 we can estimate that CATV has lead to increase in advertising revenues of 19.6%. Any market power (which would give the Herfindahl index a positive sign) would tend to bias this estimate downward.

Another technological change in the television industry in recent years is the increase of color televisions. This increase has paralleled the increased use of CATV. We attempted to determine if the confluence of these two changes might cause an overstatement of the impact of CATV.

A simple Pearson correlation coefficient between these two variables was calculated for 55 metropolitan areas in 1975. A value of .019 was found to be the very insignificant result. We thus conclude that CATV and color penetration rates are not related and that our results concerning CATV rates should be unaffected by the change in color usage.

From table 1 we can see that the local-distant distinction does not have much of an impact on the coefficient of the Herfindahl index. From the table of correlation coefficients we find that the Herfindahl index has a correlation ratio of -.03 with the ratio of local to distant viewers. These results imply that the local-distant values are not particularly indicative of CATV use and that the positive influence of CATV greatly outweighs any negative influence.

There are other facts to be presented which support this proposition. The first is the real growth of television advertising in the face of CATV growth. In 1972 television accounted for 44% of total national advertising expenditures. In 1977 the percentage had increased to 52%. At the same time CATV households increased from 30% to 50%.[10] The only reason television would increase relative to other national mediums is if television became a more effective medium relative to the others in this period. If CATV had a detrimental impact on advertising effectiveness we would not expect to find this result.

This implies that television is either increasing its viewership or advertising effectiveness. The percentage of homes with television has not changed appreciably over the period since virtually all households owned a television in this period. The amount of time spent watching television has increased somewhat over the period 1969-78 but this is not true in recent years. From March 1976 to March 1978 average daily viewing time decreased from five hours and fifty-nine minutes to five hours and thirty-three minutes. Television continued to increase its share of the market in this period, however. From 1969 to 1978, for a random sample of metropolitan areas the average viewing time increased by fifteen minutes a day. Thus it appears we cannot attribute the increase in advertising revenues to an increase in viewership. This implies that advertising effectiveness has increased over this period.

In addition we present Table 4 which relates advertising rate per

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[10]This information comes from TV Basic Facts, 1978-79.

viewing hour to CATV penetration rate by province.[11] Visual inspection reveals that provinces with high penetration rates also have high advertising rates per viewing hour. The correlation coefficient is .77 which is significant at the 95% level. The results are only suggestive since we have only seven observations and many other factors which influence advertising rates are not taken into account.

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[11]The observant reader may wonder why CATV penetration rates were not directly included in the regression on advertising rates (Table 1) instead of using the Herfindahl index as a proxy. The answer has to do with the fact that CATV penetration rates exist for areas and advertising rates exist for stations. Penetration rates could only be calculated for about 40 areas whereas Herfindahl indices were calculated for over 300. Many stations which broadcast into areas with no penetration rate data would have to be excluded from the regressions and we would have had a very small sample with which to work.

Table 4

	NRT/U.H.	CATV Pen.	Observations
British Columbia	.0558	75	6
Alberta	.0582	59	9
Ontario	.0422	58	15
Manitoba	.0426	45	5
Quebec	.0309	40	15
Atlantic	.0240	22	8
Saskatchewan	.0397	12	7

r_{XY} = .766

Z transform = 1.01

Z statistic = 2.02

Column 1 is the average advertising rate per viewing hour for each province. Nova Scotia, New Brunswick, Newfoundland and Prince Edward Island are combined into Atlantic.

Conclusions

Our basic conclusion is rather simple: CATV does not decrease advertising revenues. This result is based on several diverse pieces of information. It is contrary to the expectations held by most researchers in the field. It invalidates the arguments for most copyright proposals put forth in this area. New justifications are needed if logic is going to imply a need for copyright payments by CATV.

It is understandable why copyright payment by CATV has recently become an issue in North America. Canadian Broadcasting revenues in 1977 amounted to nearly $350 million. For CATV the figure was $232 million. CATV revenue growth was outpacing that of broadcasters. Thus CATV became an obvious target for copyright payment. In addition, CATV appears to earn a high rate of return on investment.

CATV should not be a target for copyright payment just because it is a growing business. Rational economic arguments should be the center of a discussion regarding copyright payments. If it is thought that CATV is overly profitable there are other remedies (especially since CATV rates are regulated by the government). We are not saying that no economic justification for CATV copyright payments exists. We are saying that no arguments extolling the virtues of CATV copyright payments have been made which have not relied on the assumption that CATV reduces broadcasting revenues. Our work suggests that these proposals be discarded.

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